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IS 11261-1 (1985): Methods for assessment of post harvest grain losses by rodents, Part 1: General considerations, direct measurement techniques and biological aspects of survey procedures [FAD 16: Foodgrains, Starches and Ready to Eat Foods]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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IS : 11261 (Part 1) - 1985

Indian Standard

METHOD FOR
ASSESSMENT OF POST-HARVEST
GRAIN LOSSES BY RODENTS

PART 1 GENERAL CONSIDERATIONS, DIRECT MEASUREMENT
TECHNIQUES AND BIOLOGICAL ASPECTS OF
SURVEY PROCEDURES

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Indian Standard

METHOD FOR ASSESSMENT OF POST-HARVEST GRAIN LOSSES BY RODENTS

PART 1 GENERAL CONSIDERATIONS, DIRECT MEASUREMENT TECHNIQUES AND BIOLOGICAL ASPECTS OF SURVEY PROCEDURES

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METHOD FOR ASSESSMENT OF POST-HARVEST GRAIN LOSSES BY RODENTS

PART 1 GENERAL CONSIDERATIONS, DIRECT MEASUREMENT TECHNIQUES AND BIOLOGICAL ASPECTS OF SURVEY PROCEDURES

0. FOREWORD

0.1 This Indian Standard (Part 1) was adopted by the Indian Standards Institution on 28 February 1985, after the draft finalized by the Storage Structures and Storage Management Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 Foodgrain losses due to rodents are very high, sometimes ranging as high as 25 to 30 percent. A number of studies and investigations have been carried out to assess these damages. Most efforts at rodent damage assessment have been focussed on crops under field conditions. However, each component namely cropping, handling, transportation, local storage and bulk storage is important in assessing these losses.

0.3 Although a methodology for assessing post harvest grain losses will not in itself reduce these losses, the methodology is essential to post harvest operational programmes so that priorities for loss reduction can be determined. In addition to serving as a much needed assessment tool, the methodology and other activities proposed can serve as a means to persuade all concerned that change is necessary and that effective techniques to control losses may be utilized.

0.4 This standard is being dealt within the following two parts:

Part 1 General considerations, direct measurement techniques and biological aspects of survey procedures; and

Part 2 Loss determination by population assessment and estimation procedures.

0.5 In the preparation of this standard considerable assistance has been taken from the following publication:

HARRIS (Kenton L.) and LINDBLAD (Carl J.). Post Harvest Grain Losses Assessment Methods.

1. SCOPE

1.1 This standard (Part 1) elaborates general conditions, direct measurement techniques and biological aspects of survey procedures for the purpose of assessment of post harvest losses due to rodents.

2. GENERAL CONSIDERATIONS

2.1 In order to assess field losses, if comparable fields without rodents can be found, weight or volume differences in the ultimate harvest would provide a good estimate of rodent losses provided micro-organisms, insects, birds or large mammal depredations are not involved or are assessable.

2.1.1 If a crop is left in sheaves or stacks in the field for a time, serious damage may be caused by rodents. This damage can be measured by comparing grain losses and contamination in the damaged portions with sheaves and stacks that were protected from rodents.

2.1.2 Threshing yards are known to be sites where considerable rodent damage and loss can occur. Comparing pre-threshing harvest estimates with grain finally used may ascribe losses to the wrong operational sector.

2.2 In post harvest storage losses, moisture-losses and damage from insects, fungi, birds or other parts must be assessed separately.

2.2.1 Unlike insects, which are often distributed throughout the grain stores, rodents will be at the periphery of bulk storage and often non-randomly distributed through bagged or boxed products. To ascertain rodent damage and contamination in the total contents of bulk storage units, such stores can be sampled around their perimeter to determine incidence of droppings and of gnawed kernels, but this is likely to be most difficult because of inaccessibility of this layer.

2.2.2 On a limited basis, direct and total counts of population may be obtained in a circumscribed area and losses estimated by calculating the food eaten by the population. A minimum estimate can be made by multiplying the daily consumption of an individual by the number of individuals in the population. Consumption is related to the liveweight of the animals. Mean daily consumption varies with the nature of the food stuffs and especially with its nutritive value. For cereals, the amounts of grain to be used for different species of rats per 100 g of body weight are as follows:

— <i>Funambulus pennanti</i>	4-10 g
— <i>Tatera indica</i>	6-8 g
— <i>Meriones hurrianæ</i>	3-5 g

— <i>Rattus meliada</i>	4-6 g
— <i>Rattus rattus</i>	7-11 g
— <i>Mus Musculus</i>	10-14 g
— <i>Bandicota bengalensis</i>	6-7 g

3. DIRECT MEASUREMENT TECHNIQUES

3.1 The direct measurement techniques for estimating the post harvest losses to rodents can be considered in the following three aspects.

3.1.1 *Losses to Ears or Heads of Corn Millet and Sorghum* — In such type of losses, the grain is eaten from cobs, heads or ears. Measurement consists of estimating the percentage of grain removed from the heads, shelling and weighing undamaged heads of the same size, and calculating losses by percent or actual weight loss. Samples may be taken so as to be representative of the lot as a whole if the damage is distributed throughout the lot. When damage is located in a particular portion of the stack, pile, or windrow, sampling needs to be representative of that situation.

3.1.2 *Losses to Threshed or Shelled Grain* — Problems of sampling bagged or bulk grain are of three types.

3.1.2.1 Those in which before and after weights are available or may be obtained. In many market, transport and warehousing situation, the grain has been previously weighed. Reweighings will give the amount of loss to rodents, if this is the only source of change. Initial moisture content and that at the time of reweighings are to be determined and correction factor incorporated for accurate loss estimates.

3.1.2.2 *Comparison of weights of damaged and undamaged bagged grain* — Rodents often concentrate their feeding and nesting in fairly well-delineated areas of bagged grain storage. When this is the case, damaged bags may be weighed and compared with the weight of undamaged bags taking appropriate care to obtain representative samples of bags if weights before loss are not available.

3.1.2.3 When the individual bags have already been weighed direct and actual losses may be readily obtained. Moisture contents of grain at the time of storage and the time of final weighings are to be taken into account for accurate results.

3.1.3 *Overall Losses to Grain in Storage* — In long term storage, losses involved are estimation of the rodent population and the food loss is calculated on the basis of the number of rodents \times time \times food consumption. Simple but suitable methods for general use of rodent population estimation are given in IS : 11261 (Part 2)-1985*.

*Method for assessment of post harvest grain losses by rodents: Part 2 Loss determination by population assessment and estimation procedures.

4. BIOLOGICAL ASPECTS OF SURVEY PROCEDURES

4.1 Changes in quality of stored food is also an important aspect. Losses of germ by selective feeding markedly reduces the value of cereals. Urine, feacal or hair contamination of stores may provide a disease potential and alter the aesthetic valuation. In addition to the grain eaten by rodents, there are partially eaten grains which are also unfit for human consumption. Decision of discarding such grain will vary with season, with the abundance of any particular harvest, with local or national requirements, etc.